THE STATISTICAL SIDE OF THE ECONOMIC COSTS OF WAR

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Your attention is invited, first, to a brief survey of direct and indirect costs in the present war, in order to establish a background of approximate total cost; second, to some analysis of the population and debt conditions existing at the close of the Napoleonic Wars, in order to establish certain standards; and, finally, to a brief analysis of population and debt conditions at the outbreak of the present war, during its progress, and which are likely to prevail after two years of hostilities.

The science of statistics has reached its present perfection principally through the enumeration and analysis of population. Orderly government and peace between civilized nations thus have been essential to its development. In consequence the generally peaceful century which began with the Battle of Waterloo in Belgium and ended in Belgium at Liége, has witnessed the adoption of improved statistical methods and the measurement statistically of almost all national and economic problems.

The service which this comparatively new science, developed by general peace, is able to render in throwing light on changes and trend in population and industry, has now been expanded to measure direct and indirect war costs.

It is characteristic of our time that the demand is urgent for prompt and accurate statistical measurement of such costs. Yet it is a task not to be lightly undertaken. The direct cost of the maintenance of hostile armies and fleets for one day at any time during the past year and a half of war probably has been greater than the cost from beginning to end of entire campaigns at earlier periods, even those of the eighteenth century. Moreover, back of this expenditure are unprecedented indirect burdens and possible indemnities.

More than a year after the termination of the Franco-German War Sir Robert Giffen prepared an able and exhaustive analysis of the cost of that conflict. He demonstrated that the direct and indirect war losses sustained by France aggregated $2,916,000,-000, and that Germany had made a net profit from the war over

all direct and indirect costs of $845,600,000. The Franco-German War was thus shown to be a colossal money-making adventure for Germany.[1]

Sir Robert Giffen's paper, after forty years, continues to be a model in method and treatment, but the distinguished author had the advantage of dealing with a completed chapter of history. While the current literature relating to war costs is important and often illuminating, no analysis of such costs made during the progress of a conflict can be accepted as other than a study, enlightening but incomplete, and generally possessing no permanent value. Compilations of figures still breathing—as it were—cast into tabulations, computations eked out with estimates, and official figures which change, do not form a firm basis for final conclusions. In this perilous time all things are in a state of flux. Nothing is certain but the national debt, and that increases between galley and page proof.

Even Mr. Edgar Crammond's noteworthy paper[2] upon the costs of the war, read before the Royal Statistical Society in March last, should be accepted only as a valuable and learned study. He himself seems to have realized the limitations of statistics of a war still in progress and so projected his analysis of costs forward to July 31, 1915. Computations for hostile countries, however, obviously cannot be accepted as complete or final; gaps are bridged with estimates, and inconsistencies appear. Yet Mr. Crammond's paper is likely in some respects to be the leading authority for the period it covers until such future time as complete official returns of war costs are available. Material from it already has been widely used, and occasionally without credit. In one respect, however, the English statistician's computations are open to grave question. While Sir Robert Giffen prudently avoided including in his analysis of indirect costs of war the capitalized value of human life, Mr. Crammond computes this cost in terms of pounds sterling, and falls into the inconsistency of including the capitalized value of dead soldiers in the aggregate loss for each nation, which is then compared with annual income and the proportion is suggested which it forms of the national wealth. Obviously such a comparison possesses no significance whatever. National wealth rep-

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[1] Giffen, "Cost of the Franco-German War," *Economic Inquiries and Studies,* Vol. I, p. 43.
[2] "The Cost of the War," *Journal of the Royal Statistical Society,* May, 1915.

resents material things; according to the sounder view money value of men forms no part of it.

The only possible way in which a comparison can be established is to compute the total value of all workers in a nation and to increase the national wealth by that aggregate. Total direct and indirect costs of war which include capitalized value of workers who have been put out of existence can then be compared correctly with national wealth increased to include the value of all workers.

A second and better method is to separate the rather doubtful computation covering the money value of human life from other indirect costs and present it alone.

Costs of the Present War

The following summary of costs of war to August, 1915, has been drawn principally from figures presented in Mr. Crammond's paper. They comprise the direct cost of war to the nations concerned and to individuals, but not the capitalized value of lives lost.

Within the brief period covered by this war Belgium has been denationalized, and industrial, commercial, and financial life have been gravely impaired. Considered by leading towns the loss of property amounted to more than one billion dollars, to which should be added the direct cost of the Belgian army and the loss of production. Up to August 1, 1915, the aggregate loss of Belgium seems to approximate two billion four hundred million dollars.

In France the losses have been so great and arise from such a variety of causes that one is constrained to admire the fortitude of the French people, bearing as they do not only the costs of prosecuting the war, but also the burden resulting from devastation and loss of territory. Some of the most important manufacturing districts of France were ravaged during the advance of the German army toward Paris. The total losses through destruction in the twelve departments invaded have been placed at eight hundred million dollars. Raw materials valued at two hundred and fifty million dollars were seized. German troops still occupy about seven thousand square miles of French territory. Considering the direct cost of war, the loss of national income, and the destruction of property, the total loss ascribed to France up to August last approximated nearly six and three quarters billion dollars.

A computation made in the early spring of 1915 cannot be accepted as possessing the same accuracy for Russia as similar computations for other countries. So extensive was the destruction of property during the successive defeats of the Russian army from March to October, 1915, that the addition reasonably can be made of two billions of dollars to the total of more than six billions allotted by Mr. Crammond as the Russian contribution to the toll of war loss.

The Austro-Hungarian losses, comprising direct loss in cost of war to the Imperial Government and the loss of production and the destruction of property in Austrian provinces, is set approximately at six and a quarter billions of dollars.

Much attention is paid by the English statistician to the losses estimated to have been incurred by the German Empire. After an exhaustive discussion of the German expenditures, he discovers the cost to have been greater than that incurred by any other nation. The total loss is represented by direct cost of war to the government and cities, loss of agricultural production, of manufacturing products, of interest on investments abroad, of earnings from shipping and from banking houses, and profits of insurance and mercantile houses engaged in business abroad, totalling more than nine billions of dollars.

It would not be just to suggest that Mr. Crammond was biased in his analysis of German losses, but the suspicion arises that he found the task of compiling this particular chapter so congenial that he applied himself to it with renewed and rather exceptional diligence, so that few classes of loss were overlooked. In short, while the accuracy of the computation of German loss is not challenged, it is possible that the total loss reported for Germany is a little larger proportionately than for the other nations. Had their operations been subjected to the same intensive examination possibly additional losses might have developed. These suspicions are not allayed by Mr. Crammond's opinion that "the spectre of famine will haunt the German people long before the 1915 harvest is gathered."

The loss of the United Kingdom is comprised under these items: loss to the Government and the overseas dominion, loss of production, and loss of income from banking profits. The aggregate loss is set at less than five billions of dollars. With this total the English statistician arrives at a loss for his own nation far less than

that incurred by any of the great powers at war, except Italy, which is not mentioned.

The extreme zeal manifested in analyzing German loss creates suspicion of unconscious reluctance to proceed too far in computing British loss. Insufficient reference seems to have been made to colonial costs in treasure and lives, and no loss is admitted from destruction of shipping. Furthermore, the naval losses of both Germany and Great Britain have been considerable. To November 20, 1915, Germany appears to have lost sixty-eight naval vessels with tonnage aggregating 251,623; Great Britain, forty-two naval vessels, aggregating 268,682 tons.[3] The loss thus caused to the German Government approximated $100,500,000; to that of Great Britain $107,500,000.[4]   About half only of these valuations are included in the English statistician's study.

British war disbursements which were computed by Mr. Crammond at from $10,000,000 to $12,500,000 daily, advanced, as a matter of fact, to $17,500,000,000 before July 31 and continued to rise. Government expense and probably also the indirect expenses seem to have increased at higher rates than were allowed in Mr. Crammond's calculations.

It should be observed that Italy, Turkey, Bulgaria, and Servia are not included in the above summary. Mr. Crammond's analysis indicates that direct government obligations for war represent approximately one half of the total costs thus far developed. The Italian war loans now amount to $579,000,000. Assuming this to be one half of the cost of the war to Italy thus far, the total cost has been $1,158,000,000. To Turkey, Servia, and Bulgaria the aggregate cost of the war cannot be less than one billion dollars. Furthermore all the nations of Europe which have preserved a neutral attitude nevertheless have incurred losses which in some cases are very heavy. Probably they exceed in all a half billion of dollars, since mobilization occurred more than a year ago in Switzerland and Holland. The maintenance of standing armies in those small nations and for a brief period in Roumania and Greece has been a source of large expense. Returning therefore to the summarized cost of the present war, the total losses computed by Mr. Crammond, with the additions here noted, are these:

[3] Naval Losses in the War, *Boston Transcript,* Nov. 19, 1915.

[4] Computed on the usual basis of a ton value of $400.

DIRECT AND INDIRECT COST OF WAR TO JULY 31, 1915

Belgium $2,364,390,000
France 6,504,624,000
Russia 8,346,000,000
Great Britain 4,475,880,000
Austria-Hungary 6,133,320,000
Germany 9,214,560,000
Italy 1,158,000,000
Turkey, Servia, Bulgaria, and loss of neu-
    tral nations, estimated 1,500.000,000

Total $39,696,774,000

If we classify this total by allied nations it appears that up to the end of July, 1915, Germany and her allies had incurred a loss of approximately seventeen billion dollars, while, to the same date, France, Great Britain, and their allies incurred a loss of more than twenty-two billions. Although these figures are beyond the power of the human mind to grasp, they do not adequately represent the present costs of the great war.

The date to which Mr. Crammond's computation was projected (August 1, 1915) long since has passed. With the approach of the year 1916 no signs of peace appear, but expenditures increase. The British Chancellor of the Exchequer, speaking in September, estimated that the war debt of Great Britain would amount to $7,500,000,000 by April 1, 1916. In the same month (September 15) the Prime Minister informed the House of Commons that the expenditure had averaged $13,500,000 daily from April 1 to the end of June; from July 1 to 17, $15,000,000 daily; and from July 18 to September 11 over $17,500,000 daily.[5] Carrying forward this narrative of rising costs, the Prime Minister announced on November 10 that the daily expenditure from September 12 to November 6 averaged $21,041,000, and that during the next two months war costs were likely to reach almost $25,000,000 daily. He further stated that the new credits requested would provide for British war expenditures and loans to February 16, 1916, at which date the government war loans would total approximately $8,000,000,000.[6] This indicates that from the Chancellor's estimate of early September the war debt increased half a billion dollars and the period over which the smaller sum had been expected to extend was not reduced by six weeks,—costly weeks still to be covered at $25,000,000 per day. Thus the estimates made

[5] *Circular of the National City Bank of New York*, October, 1915, p. 5.
[6] *Boston Herald* Cable Dispatch, Nov. 11, 1915.

by a British cabinet minister in September to provide for the probable war expenditure for less than seven months of the immediate future were raised two months later one and a half billion dollars to cover the same period.

Mr. Crammond estimated British government expenditure for the first year of hostilities, that is, to August, 1915, at approximately $3,500,000,000. Eight months later, however (April 1, 1916), the war debt will stand at $9,000,000,000,—if the amount is not again raised.

The foregoing statement illustrates the gathering volume of war cost, vast as it was earlier in the conflict, and also the difficulties which confront the statistician who attempts to measure war in the making. It is clearly evident from the changed proportions of British war expenditure (typical of that in progress in both groups of belligerents) that the aggregate of $39,696,-774,000, already noted, which comprised direct and some indirect loss and the expenditures of small nations and of mobilized neutrals to August 1, 1915, long since has been left far behind. War costs generally appear to have been increasing, and this, perhaps, must be expected for a time. The aggregate costs during the first year of the war, approximating $40,000,000,000, computed on the same basis, have now advanced to nearly $55,000,000,000 and will have mounted to approximately $80,000,000,000 by August 1, 1916, the end of the second year.

Incomprehensible as this total is, there is no certainty that its magnitude is sufficiently overwhelming to compel peace. Moreover, in the shadow of colossal expenditure for prosecuting the war and the heavier burden of indirect cost lurks the probability of oppressive indemnity.

Capitalized Value of Human Life

Some reference is appropriate here to that perplexing item of indirect cost of war represented by loss of human life. Whatever diversity of opinion may exist concerning the amount or influence of this loss, we shall agree that the death or total incapacity of millions of the strongest and most capable men in the great nations of Europe inflicts upon each a grievous loss, not only in human strength, but in capital and income. We also shall agree that no standard for this loss can be established without a general knowledge of the size and value of the whole age group from which those who are killed or incapacitated are withdrawn.

In 1910 or 1911 the number of men within the age group approximately 15-50 years in the nations now at war was as follows:

MALES OF VIRILE AGE (15-50) IN POWERS AT WAR, 1910-1911[7]

Austria-Hungary
Austria	6,919,000
Hungary	5,816,000
Belgium	2,089,650
France	10,034,400
Germany	15,658,578
Italy	7,426,807
Russia	28,661,500

United Kingdom
England and Wales	8,917,571
Scotland	1,146,739
Ireland	1,094,361
Total	87,764,606

From these returns it appears that at the most recent census males of virile age in the nations specified approximated 88,000,-000, men. This aggregate of course included the defectives of all classes within the age groups, estimated by some authorities at 25 per cent. On the other hand the return is for 1910-11 and thus the aggregate is smaller than actually existed in 1914. Accepting 80,000,000 as a reasonable base, what is the average value of this vast group of human workers?

Sir Robert Giffen, in his half-apologetic discussion of the value of human beings in pounds sterling,[8] computed the average earning power of each active male at £40, or about $200. He then reckoned the present value of an annuity of £1 on a single life at the age of 25, and arrived at a valuation per worker of £600.

Crammond, citing various authorities, concludes that workers are worth sums varying in different European countries from $1964 for a Russian to $4024 for an Englishman. Upon the basis of these figures he computes the lives lost to July 31, 1915, as worth an aggregate of $11,475,000,000, an average value of $2933.

[7] Compiled from respective census reports, the age groups and census years being as follows: Austria, years 15-50, computed from Austrian census, 1900; Hungary, years 15-59, census of Hungary, p. 14; France, years 15-50, estimated from census of France, 1906; Belgium, years 15-55, census of Belgium, 1910; Germany, years 16-50, census of Germany, 1910; Italy, years 16-50, census of Italy, 1911; Russia, years 16-50, estimated, census of Russia, 1897; Great Britain, years 16-50, census of England and Wales, Scotland, and Ireland, 1911.

[8] "Cost of the Franco-German War," *loc. cit.*

If this valuation be applied to all male workers of virile age in the six powers at war, already computed to number 80,000,000, it appears that the aggregate capitalized value of human life represented in this element of the population is $234,640,000,000.

It has been estimated by Dr. S. N. D. North, the statistician of the Carnegie Foundation for International Peace, that in July, 1915, the armies of the warring nations aggregated approximately 23,375,000 men. To this should be added the Italian and Bulgarian armies estimated at 1,400,000, the new Russian armies and new levies, aggregating in all perhaps 6,500,000 men. Hence, in the absence of more definite information, the aggregate number of men called to the colors by the end of the second year may be set at 30,000,000. Losses for the first year were computed by Mr. Crammond to range from 11 per cent to 33 per cent. Assuming the war to last for two years, 40 per cent would be a moderate approximation of loss likely to cover service mortality and incapacitated survivors. Such proportion would imply a loss from all causes of fighting men to the number of 12,000,000. The capitalized value of this number of human beings upon the basis of the previous computation of human war loss would be $35,196,-000,000, or about one sixth of $235,000,000,000, previously computed as the capitalized value of all males of virile age in these nations.

Attempts to capitalize the value of human life proceed necessarily from an uncertain base. Even if a definite valuation be established, the number killed and incapacitated in the present war is now and will long continue to be a matter of conjecture. Of doubtful value under the most favorable conditions, the foregoing computation of capitalized value of human life is included here principally as an illustration of the magnitude of indirect loss in this war,—a loss made more striking by being expressed in terms of money value.

Let us not, however, fall into the error of concluding that the nations at war are wrecked or impoverished, or that these extreme conditions will obtain even at the end of another year of warfare. The human race has busied itself through the ages with two principal tasks: destruction and rebuilding. The history of Europe is a record of almost ceaseless conflicts, many of which lasted to the point of actual exhaustion. In the great march of events it matters little whether Hannibal is devastating the plains of Italy or the German is obliterating Belgium,—or annihilating Serbia. In our time population and wealth have greatly increased, conse-

quently the absolute figures of carnage and waste are much greater, but proportionately the change is less pronounced.

If we agree that destruction today is vast and recovery tomorrow vast also, is there no measurement to be contrived from past experience with which we may in a manner determine debt limitations, and by which we may reassure ourselves concerning population recovery?

We observe that a certain vague similarity exists between the events in Euroge a century ago and those of the present time, since the great powers—and for the most part the same powers though with different alignment—are again at war. What light, if any, is to be thrown upon modern war problems by the population and debt conditions which prevailed at the close of the Napoleonic Wars?

Population at the Close of the Napoleonic Wars

In the year 1816 the great nations were emerging exhausted from the then greatest conflict the world had known. These recurring wars had involved most of Europe, and had lasted, with brief periods of armed peace, from 1793 to 1815. During this period of twenty-two years the upheavals of society in France and in Great Britain, and great industrial changes, created a widespread demand for statistical information and led to the establishment of periodic census taking. From these returns and for other nations from such computations as have weight, the population in 1816 of the countries now at war, appears to have been 164,390,143.

POPULATION IN 1816 OF THE NATIONS AT WAR IN 1915

Russia (Europe)	45,000,000[10]
France	29,676,148[11]
Austria	27,000,000[12]
Germany	24,833,000[13]
United Kingdom	19,500,000[14]
Italy	18,380,995[15]
Total	164,390,143

[10] *Stateman's Year Book*, 1915, p. 1272.

[11] *Census of France*, 1911, p. 16.

[12] Computed from Levasseur and Bodio, *De la superficie*, etc., pp. 46, 54, 91.

[13] Computed from Bertillon, *Statistique Internationale resultant des Recensements de la population exeécutés dans les divers Pays de l'Europe de le xix Siecle*, etc. (Paris. 1899), pp. 27, 30, 34, 70.

[14] Whitaker's *Almanac*, 1915.

The population of Europe in 1816 was composed largely of peasantry, supporting themselves from the soil. The number of inhabitants per square mile in the nations here considered, exclusive of Russia, varied from 104 in Austria-Hungary to 166 in the Italian states. This remarkable uniformity reflected the generally agricultural character of the nations. After a quarter of a century of recurring wars most of the people were poor and bereaved, and countryside and city were war-scarred. The economic changes, however, which were impending were of the most revolutionary character.

By 1816 the application of steam to industrial and transportation uses was opening in Europe a new realm of activity and profit, by which, with safe and rapid interchange of products, employment was provided for additional millions. Moreover, here was actually an invitation to nations already well populated and having small geographic areas to increase their population.

After the passage of 100 years (in 1914) the population of the great powers now at war was as follows:

POPULATION IN 1914 OF THE NATIONS ABOUT TO ENGAGE IN WAR

Russia (In Europe, including Poland)	141,679,176[15]
Germany	68,442,262[16]
Austria	51,080,081[17]
United Kingdom	46,498,959[18]
France	39,947,699[19]
Italy	35,597,784[20]
Belgium	7,747,441[21]
Total	390,993,402

To increase due to industrial growth Russia proved an exception. Increase came to the Russian Empire in liberal measure because vast areas of fertile land and many natural advantages offered support and invited increase, so that the population of European Russia tripled in the century from 1816 to 1914.

[15] *Statesman's Year Book.*

[16] *Census of Germany,* 1910, Pt. 2, pp. 240-53; Census U.S., 1910, Vol. 1, p. 252, Table 8.

[17] *Census of Austria,* 1910, Vol. 1, Pt. 1, p. 49; *Census of Hungary,* 1910, p. 14; *Census of U.S.* Vol. 1, p. 252, Table 8.

[18] *Censuses of England, Wales, Scotland, Ireland,* 1911.

[19] *Census of France,* 1901, p. 978; 1911, Pt. 2, pp. 240-53.

[20] *Census of Italy,* 1911, Vol. 2, p. 638, Table 4; *Census U.S.,* 1910, Vol. 1, p. 252, Table 8.

[21] *Census of Belgium,* 1910, Vol. 2, p. 470.

In Austria the inhabitants per square mile, 104 in 1816, became 195 in 1914.

France lagged behind in population growth. The number of inhabitants per square mile increased from 143 in 1816 to 193 in 1914. This was substantially the same as that attained by Austria upon larger area.

In the United Kingdom 160 inhabitants per square mile in 1816 became 382 in 1914. Possessing colonies around the world—several of them empires in themselves—the mother country became the manufacturing and urban centre for the empire. Therefore dense population in the United Kingdom does not necessarily indicate congestion. Italy, having the smallest geographic area of the group of nations here considered, increased in the number of inhabitants per square mile from 166 to 321.

The most significant changes occurred in the area which became the German Empire. In 1816 the inhabitants of Prussia and the other German states numbered 123 per square mile. Under the spur of amazing industrial development and perhaps in some unconscious way influenced by the conviction of destined world power, the inhabitants of Germany, though possessing small geographic area, grew so rapidly in numbers that they tended to congestion. In 1914 the population of the German Empire approached 70,000,000, having thus increased to nearly three times the population shown in 1816 upon practically the same area, a rate of increase exceeded only by Russia.

Colonial outlets, which the United Kingdom found so efficacious in meeting the same problem, were of doubtful value to Germany, or if of ultimate value, were slow of development. Emigration, the other main source of relief, also failed. From 1890 to 1910 the number of persons in the United States born in Germany decreased in number 283,561.[22]

Austria and Italy found an outlet for a part of their surplus population by liberal emigration to other lands. In twenty years, from 1890 to 1910, the number of Austro-Hungarians in the United States increased from 303,812 to 1,670,624. Italians increased from 182,580 in 1890 to 1,343,125 in 1910, but German emigration declined to a negligible figure.[23] German increase, therefore, all appeared in Germany. The number of inhabitants

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[22] *U. S. Census*, 1890, Pt. 1, p. 607; 1910, Abstract, p. 190.

[23] The total emigration from the German Empire, 1909-13, inclusive, was 117,530. (*Statesman's Year Book*, 1915, p. 928.)

per square mile in the empire increased from 123 in 1816 to 328 in 1914. In short, in the great plan of preparedness, since 1816 child-bearing has been first in importance to the German Empire.

Of the six great nations here considered, Germany has thus revealed exceptional characteristics. It possessed in 1914 small area, supported a huge and increasing population, exhibited limitless self-confidence, and provided no outlet for its surplus numbers.

But if it was evident that the increase in the number of the German people was finding no adequate outlet and that the characteristics and temper of the nation were such as to suggest reversion to age-old methods of reducing population pressure, what shall be said today? Should Germany win the present contest, doubtless congestion will be relieved, as it has been relieved through the ages, by absorption of conquered territory. In that event the drama now being enacted before the modern world will have been simply the repetition (with a few concessions to civilization compared with ancient practices) of those great population movements which in the past arose generally in Asia and swept over vast areas with fire and sword.

But if Germany does not win, if the opposing nations succeed in controlling this natural rising of a great human tide, and confine the German race again within its narrow bounds, what then? In that event we shall agree that, if national calamity does not impair fertility, the present blood-letting process by war could not long relieve population congestion. Courage and virility can repair human losses for Germany within a decade or two, and then the process of steadily increasing population pressure must begin again. Except that one trial has failed because mistakes were made, in what respect would the new population condition then submitted to the statistician for interpretation differ from that which actually existed a decade ago?

Replenishing Human Loss

We have thus considered some aspects of normal population change in the powers now at war. In what respect are the losses occasioned by the war, and the influences of the great conflict, likely to affect the future population of the nations involved?

For the census decade nearest to 1914, population in the powers now at war increased as follows:

POPULATION INCREASE OF THE POWERS NOW AT WAR AS SHOWN BY THE
LATEST CENSUSES

Russia	27,148,442
Germany	8,625,060
Austria-Hungary	4,053,154
Great Britain	3,761,439
Belgium	730,226
France	349,242
Italy	2,196,124
Total	46,836,730

Assuming the births to be divided with practical equality be-
tween the sexes, the males born in these nations during this ten-
year period exceeded those dying by approximately 23,000,000.
Elsewhere it has been estimated that the war losses in human life
will approximate 12,000,000 by July next. Upon the antebellum
basis of increase, to replenish such loss would require more than
five years' product of male births. Obviously a five-year period is
too short. The population group of approximately 88,000,000
males of virile age will have been reduced by nearly fourteen per
cent. While it is impossible to predict the effect upon population
of sharp reduction in the number of males possessing high
virility, it is probable that clear evidence of such reduction will
appear. In some cases where increase long has been slow, as in the
case of France, there is a grave possibility that the loss may never
be recovered.

There is another factor to be here considered. Before the be-
ginning of the present war males were in a decided minority in all
six powers involved. Though the disproportion varied somewhat,
the excess of females reached the rather remarkable aggregate of
5,600,000.[24] Emigration to America was in part responsible for

[24]EXCESS OF FEMALES 1910-1911

Great Britain	1,328,625
France	634,000
Germany	841,800
Austria-Hungary	699,711
Russia (including Poland)	1,344,400
Italy	627,997
Belgium	62,206
Total	5,538,739

(Derived from official census tables specified in notes, page 104, except for
Russia, for which figures are compiled from the *Russian Year Book*, 1912, and
France, for which the excess is computed from the census of 1906.)

this condition though it occurs also in countries from which there are few departures. Added to the direct war loss of approximately 12,000,000, the male sex may be expected to begin the new era of peace to be hoped for after the close of this war 17,600,000 less in number than the female sex.

We are confronted here by two interesting statistical problems toward the solution of which no previous data exist.

First, will the new and grave aspect of life which accompanies the tragedies and momentous events of war, will bereavement, loss and quickened patriotism, and, above all, will instinct, lead the men and women who survive and take up the burdens of home and nation after this war to make good by increased fertility the loss in strong men which Europe has sustained?

Second: At the beginning of the nineteenth century, France, because of constant wars, was found to be reduced in proportion of males to females as 950 to 1000.[25] This proportion applied to the aggregate population of the six powers at war would result in an excess from all causes of approximately ten millions of females. Upon the assumption of an early termination of hostilities, the foregoing analysis has shown that an excess of not less than 17,600,000 females is to be expected at the close of the present war. This excess would represent for every 1000 women but 914 men.

Nature equips the male to meet emergencies of reasonable sex disproportion and through the ages seemingly has expected this condition to exist. But the impending disproportion in Europe will be unusual. It is possible, indeed, that sex equilibrium may be so distributed as to affect social and economic conditions for several decades. What, therefore, is to be the effect on population change of the great excess of women?

No statistician of our time has expected to see these problems worked out to a solution during his own lifetime, nor has he expected a solution to appear for many decades, yet before us in the quick march of events that are to follow the war which is now being waged, some great natural law will begin to reveal itself, under the influence of which men and women will set about the early repair of human loss, or else one or more of the nations involved in this conflict will face continued weakness, which is certain to lead to destruction or absorption at no distant date.

[25] Mulhall, *Dictionary of Statistics.*

Measurement of Indebtedness

There remains to apply briefly some measurement to changes in national indebtedness and increases due to the cost of war.

Utilizing again the historic year 1816 from which to establish comparisons, the national indebtedness in that year of the nations now at war was as follows:

NATIONAL DEBT IN 1816 OF POWERS NOW AT WAR

Country	National Debt[26]	Per Capita
Germany	$125,000,000	$5.00
Italy	125,000,000	7.00
France	250,000,000	9.00
Austria	415,000,000	14.00
Russia	765,000,000	17.00
Great Britain	4,502,180,000	224.00
	$6,182,180,000	

In 1791, at the outbreak of the French Revolution, the national debt of France had reached burdensome figures, amounting to $2,275,000,000, a per capita debt of about $85. This was the largest debt in the world at the close of the eighteenth century, the next largest being that of Great Britain which approximated $70 per capita. The French Revolution summarily disposed of the problem and burden of the national debt. Most of it was repudiated. Therefore, when France emerged from her troubled era of victory and defeat, in 1816, the acknowledged debt as included in the table above was little more in amount than one tenth of the repudiated debt.

Of greater interest and significance was the debt of Great Britain. It greatly exceeded the combined debt of the five other powers, indicating that for twenty-three years in victory and defeat the British nation had borne the burden of financing the Napoleonic Wars.

In 1793 the national debt of the United Kingdom approximated more than $1,000,000,000, representing the accumulated debts of the Marlborough campaigns in the reign of Queen Anne, the debts of the first two Georges, and that incurred in connection with the American Revolution. To this total the Napoleonic Wars added $3,007,501,715, resulting in 1816 in the great aggregate indebtedness recorded above, of $4,500,000,000.

[26] In 1816 or the nearest year for which figures are available.

The national wealth of Great Britain in 1816 has been estimated at $12,500,000,000.[27]   Hence the public debt was equivalent to more than one third of the national resources.   The relationship is more striking when reduced to a per capita basis.   The wealth per capita being $625 and debt $224.

In 1914 the national wealth of Great Britain was $88,000,000,-000, a seven or eightfold increase in one hundred years.   The per capita wealth was thus $1825.   If the proportion of debt to wealth which existed in 1816 should be reached by the end of this war, the debt per capita would amount to $654, consequently the British national debt could reach the colossal total of $30,476,000,000, and still bear merely the same proportion which national debt per capita bore to national wealth per capita a century ago.   Yet it does not follow that Great Britain, having carried a debt equal to one third of the national wealth in 1816, can duplicate this achievement, even if necessary, in 1916.

We all shall agree that the increase in national wealth makes it possible for the per capita burden of debt in 1916 to be somewhat increased over that borne in 1816.

But the extent of the increase beyond the earlier figure is another matter.   Material increase in dead-weight debt beyond the per capita actually borne in 1816, without disaster in some form, is open to grave doubt.   It must be remembered that the real value of our modern standard of measuring resources known as "national wealth" has never been tested before under strenuous demands of war.

Fortunately for Great Britain, in 1816 the civilized world was on the eve of an industrial awakening having no precedent in earlier history.   The United Kingdom led in this form of development.   The nation advanced in national wealth by rapid strides. Thus the burden of debt, so heavy at the close of the Napoleonic period, decreased until it ceased to be a burden, and the debt became merely a permanent and easily borne charge.   After 1916, however, it is unlikely that the nation can duplicate the era of industrial creation which followed 1816.   It will be no easy task merely to retain undiminished the great volume of business previously secured.   It will be well-nigh impossible materially to increase it.   Hence repetition in our time of the nation's success in lightening the burden of debt existing in 1816 by phenomenal increase in resources is not to be expected unless new avenues of wealth appear.

[27] Sir George Paish, in the London *Statist.*

Thus far in this discussion of indebtedness existing in 1816 as affording some means of measuring public indebtedness at the outbreak of the present war, attention has been devoted principally to Great Britain as the actual debt bearer of the earlier period. It has been pointed out that during the century from 1816 to 1914 population increased greatly in all of the six powers here included. Hence consideration of the following table which presents indebtedness for each of the powers as it would have been in 1914 if computed on the basis of the per capita debt existing in 1816, in comparison with the actual public debts of these powers in 1914 proves of some significance.

NATIONAL DEBT AS IT WOULD BE IN 1914 ON 1816 BASIS, AND ACTUAL DEBT

Country	Debt as it Would Have Been in 1914 on the 1816 per Capita.	Actual Debt in 1914[27a]	Actual per Capita
Germany	$339,060,000	$4,860,000,000	$72
Italy	249,184,488	2,536,920,000	61
Austria	711,354,000	3,790,800,000	75
France	3,422,800,000[28]	4,932,900,000	124
Great Britain	10,438,400,000	3,192,448,463	68
Russia	2,136,626,521	4,592,700,000	36
	$17,297,445,009	$23,905,768,463	$65

Inspection of this table reveals that the rough similarity of the theoretical or computed debt to the actual debt is produced by the huge contribution of Great Britain; therefore one is tempted to doubt the accuracy of including such an exceptional figure. It is clear, however, that in the computation the aggregate only is of interest, because Great Britain incurred financial burdens which other nations obviously must have contracted and carried in order to oppose France had Britain not done so. It is clear also from this measurement of European indebtedness in terms of the debt of 1816, that although the debts of the earlier period represented in most instances the accumulated expense of long, frequent, and costly conflicts, and although in proportion to wealth and population they formed exceptionally heavy national burdens, the century of peace which followed terminated with all the nations included in this analysis, except Great Britain, bearing much larger

[27a] Compiled from Whitaker's *Almanac,* 1915.
[28] Per capita base includes debt repudiated in 1793.

absolute and per capita indebtedness than would have resulted if
the debt had remained in the 1816 proportion. This increase of
debt in time of peace, and under conditions seemingly favorable
to national economy, reflects the influence of increased national
wealth. The national wealth of the six powers in 1914 was as
follows:

NATIONAL WEALTH IN 1914 OF THE POWERS AT WAR

Great Britain	$88,060,000,000[29]
Germany	83,250,000,000[30]
Russia	60,160,000,000[30]
France	59,000,000,000[31]
Austria	55,580,000,000[30]
Italy	20,000,000,000[31]
Belgium	12,000,000,000[30]
Total	$378,050,000,000

On the basis of British increase in national resources during the
century following 1816, the aggregate wealth of the six nations
specified could not have exceeded $60,000,000,000 at the close of
the Napoleonic Wars. Therefore, while a long period of peace
was increasing population two and one-half times, and adding
more than sixfold increase to national wealth, increase in national
indebtedness also doubtless was to be expected. Since the indebt-
edness of each of the five powers, France, Germany, Austria, Rus-
sia, and Italy, was very much larger in 1914 than it was in 1816,
and seems never to have been smaller than it was at the earlier
date, clearly the indebtedness existing in 1816 has never been
repaid.

Compared with the aggregate national wealth of the nations
considered, their debt in the year 1914, the final year of peace,
was little more than six per cent. Each nation, however, found its
obligations persistent, burdensome, and tending to increase. Five
of the six nations began the century of peace with relatively small
indebtedness; they closed it with aggregate national obligations
nearly thirteen times larger than existed in 1816. Hence the rate
of increase in debt in these nations seems to have outstripped the
rate of increase in national wealth in the proportion of nearly
two to one.

In the case of Great Britain, between 1817 and 1837 the huge
public debt existing in 1816 was reduced $300,000,000 by moder-

[29] Sir George Paish, in London *Statist.*
[30] Crammond.
[31] National Geographic Society.

ate annual payments. Between 1837 and 1858 some increases occurred; since 1858 there have been small payments each year with a few exceptions. The aggregate of these payments amounts to about one third of the debt owed in 1816. This reduction is equivalent to settling the bills for the campaigns of the Duke of Marlborough, the debts of the Georges, and half the cost of trying to suppress the American Revolution. But after the lapse of a hundred years, a period of almost continuous peace, Great Britain, wealthiest of the nations of Europe, still owes half of the cost of attempting to conquer her rebellious American colonies and *all* of the debt incurred during the long period of Napoleonic Wars.

Inquiry concerning the national indebtedness in 1816 of the six powers now at war thus has resulted in arriving at certain measurements of the increase recorded in 1914, and on the basis of which to consider further increase.

War Debts and Aggregate Indebtedness

The following table is a combination of the table of war debts published in the London *Statist* of October 23, with additional definite flotations reported in the table despatches since that date, but not including the recent French so-called "loan of victory," or the new German loan. From neither of these is the amount realized yet known. They will probably aggregate $5,500,000,000.

WAR LOANS OF NATIONS AT WAR TO DECEMBER 1, 1915

Country	Aggregate War Loans or Debts[32]	
	National Money £=$4.86; mark .238; crown .193; franc, 18₁₅; rouble .51; (Custom House standard); Lire .18.)	*Dollars*
Great Britain	1,232,600,000 £	
	430,000,000 £	$8,077,320,000
Germany	30,000,000,000 Marks	7,140,000,000
Austria-Hungary	550,000,000 £	
	257,200,000 £	
	2,000,000,000 Crowns	4,308,992,000
France	20,580,000,000 Fr.	
	425,341,000 Fr.	3,871,940,000
Russia	7,000,000,000 Roubles	3,570,000,000
Italy	3,216,350,000 Lire	620,755,550
Total	....	$27,589,007,550

[32] London *Statist*, October 23, pp. 182-4, and Cable despatches, London, Nov. 10; Paris, Nov. 15; Vienna, Nov. 16; Berlin, Nov. 20.

The known debts contracted up to the end of 1915 in order to wage the present European War, are thus shown to aggregate more than $27,000,000,000. Combined with previously existing obligations these grand totals result as follows:

AGGREGATE NATIONAL DEBTS OF NATIONS AT WAR, DECEMBER, 1915

Country	Total Debt	Per Capita
Germany	$12,135,000,000	$177
Great Britain	11,269,768,463	242
France	8,776,815,000	220
Russia	8,162,700,000	57[33]
Austria-Hungary	8,113,792,000	159
Italy	3,115,920,000	87
Belgium	825,518,000	106
	$52,399,513,463	$134

These vast obligations now aggregate more than eight times the total indebtedness of the same nations at the close of the Napoleonic Wars. They form, moreover, a slightly larger proportion of the aggregate wealth of the nations concerned than did the total obligations existing in 1816 under the unfavorable conditions of long and exhausting wars.

The per capita indebtedness in 1915 of the United States and of the states combined, is approximately $45. The per capita national indebtedness of the powers at war was approximately one and a half times that amount before the outbreak of hostilities. As the year 1916 begins per capita indebtedness has advanced to three times that of the per capita American federal and state debts combined, and in Great Britain it is nearly six times the American per capita. This high figure is curiously close to the British maximum debt per capita in 1816, which it already slightly exceeds.

The outpouring of treasure by Great Britain in 1816 must have astonished alike allies and adversaries during the Napoleonic Wars. If we interpret present British war costs aright the same national traits that controlled England in the wars against Napoleon, that contracted unprecedented debt and never yielded through twenty-three years of contest, are being again clearly manifested in the present war.

[33] Basis of population of Russia in Europe.

The Resources of Nations at War

At the close of the Napoleonic period indebtedness was expressed, with one exception, in millions of dollars. In our own period, a century later, growth in population and wealth compelled financial operations on an unprecedented scale, and public debt is now expressed in every case in terms of billions. In public operations the use of this unit is likely to become more and more frequent. One is already tempted to advance in grand totals to the next unit of value and speak in fractions of trillions. Indeed, as the wealth of the world now approximates a trillion of dollars, the serious use of that unit by our children or grand-children may be in sight.

Comment of this character is useful principally to illustrate how unreliable and unsatisfactory must be all analysis dealing with aggregations of national wealth when several important nations are engaged at the same time in vast financial operations. Any simultaneous efforts by the powers now at war to raise great additional loans because national wealth still looms large are likely to develop the illusory character of national wealth as a cash asset. The attempt of the world, for example, to realize on its trillion of dollars of wealth would result in utter confusion. In short, the effort of all the great powers of Europe to float large additional loans based on huge aggregate resources will tend to depress such resources, though perhaps temporarily, toward paper values only. The real and permanent value of national wealth obviously depends upon the facilities such wealth affords to create more wealth. The great nations now at war are not only destroying national wealth, but, even while they endeavor to realize on their own, they are impairing wealth producing activities.

Of what present value to Germany are her hundred million's worth of ships idle in American ports, or her world commerce temporarily wiped out, or to Germany, France, and England the closed factory while skilled operatives are at the front, many never to return?

The extreme to which the demands of war have already invaded the private affairs and industries of the nations concerned is illustrated by the increasing control exercised in England over exports. All goods to be shipped to American purchasers are now delayed to permit thorough search in order that nothing of use to the British government may leave the kingdom. Fine fabrics,

for example, when at length passed, are billed under the stamped legend, "Not available for aeroplanes or war use."

In short, the conclusion seems justified that the great powers at war, after a year and a half of hostilities conducted on a scale of unprecedented expense, have nearly reached the end of large cash loans from reserve resources and free money, and must hereafter depend more and more on what we may term a hand to mouth support, that is, the appropriation of a large share of the current earnings of the people. This statement is substantiated by the mystery surrounding the amounts realized from the recent French and German loans.

The expenditure, if maintained at the present rate, will be such that even the appropriation of much of the current income is not likely long to suffice, so that after two years of such colossal outlay signs of exhaustion must appear.

This does not imply compulsion to suspend hostilities. It might mean that initial extravagance would be succeeded ultimately by more old fashioned and less costly forms of war.[34]

This great conflict of all time has been made possible by civilization's perfected system of banking and loans, which thus proves at once a blessing and a curse,—a blessing by enabling nations to finance the defense of rights and territory, a curse by offering perfect machinery for passing on to future generations gigantic burdens greater than the world has known before.

Yet no study of present war costs will be complete which dwells upon the magnitude of expenditure and fails to point out the fact that going nations do not become actually bankrupt. All costs in our time are incurred on such vast scale that national recovery from loss naturally becomes more complicated, but recovery surely awaits every nation which has the capacity to earn it. France offers a convincing example of the truth of this statement. In 1871 she emerged defeated from the war with Germany, prostrate, shorn of provinces, ravaged, bereft of thousands of her strongest, and with even sovereignty dependent upon the payment of a huge indemnity. Yet, forty years later, France rallies to oppose her

[34] "Two things seem clear, that the allies are expecting to make their most powerful effort in the early spring, 1916, and that to meet the expected drive the Germans will call up every man available, probably exhausting their reserves. If peace does not come in the interim, the spring campaign will be the most desperate and terrible of the war. And if that gives no decision a slow waning of the war from progressive exhaustion may be expected."— *Springfield* [Mass.] *Republican.*

ancient enemy stronger in men, resources and wealth than at the earlier period.[35]

If from the present tragedy the people of the nations involved emerge with permanent and helpful readjustments and with courage unimpaired, doubtless national debts and population inequalities, however large, in time can be adjusted.

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[35] France was in fact invaded, had to bear the losses incidental to that state, had to pay as the war went on, a large part of the invaders' cost, and in the end had to pay an indemnity and suffer loss of territory which nearly doubled its losses. The loss of capital and the addition to the national debt are enormous, while several years must elapse before France at the ordinary rate of progress is even at the point of industrial prosperity which she had attained before the war.—Giffen, *Economic Inquiries and Studies,* Vol. I, p. 48.